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U.S.S.N. 09/121,152

Filed: July 22, 1998

## AMENDMENT AND RESPONSE TO OFFICE ACTION

## In the Claims

Claims 1-20 (previously cancelled).

21. (currently amended) A method of de-inking waste printed paper, comprising  
a) pulping at a pH of less than between 3 and 8 waste printed paper with an enzyme  
capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH  
between about 3 to less than and 8, wherein ink is dislodged from the waste printed paper by  
action of the enzyme; and

b) removing the dislodged ink particles from the resulting pulp containing medium.

22. (Original) The method of Claim 21 wherein dislodged ink particles are removed by  
flotation.

23. (Original) The method of Claim 21 wherein dislodged ink particles are removed by  
washing.

24. (currently amended) The method of Claim 21 wherein the amount of enzyme used is  
in the range of about 0.005 to about 5 percent-by-weight based on the dry weight of the  
wastepaper.

25. (currently amended) The method of Claim 1, wherein said enzyme is selected from  
the class consisting of cellulases, hemicellulases, pectinases, ~~ether~~carbohydrases and mixtures  
thereof.

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26. (currently amended) The method of Claim 21 wherein said enzyme is a cellulase selected from the group consisting of cellulases derived from *Trichoderma viride*, *Aspergillus niger*, hemicellulases, other carbohydrases and mixtures thereof.

27. (currently amended) The method of Claim 21 wherein alkali is not added to the the pH of said aqueous medium is from about 3 to 7.

28. (currently amended) The method of Claim 21 wherein the pulping occurs at a consistency of pulp wastepaper pulping consistency of about 12% or greater.

29. (cancelled)

30. (currently amended) The method of Claim 1 wherein the temperature of the pulping is in a range of from about 20°C room temperature up to about 60°C.

31. (currently amended) A method of recycling waste printed paper, comprising:

a) pulping waste printed paper;  
b) contacting at a pH between about 3 to less than and 8 waste printed paper at high wastepaper pulping consistency with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH between about 3 to less than and 8, wherein ink is dislodged from the waste printed paper by action of the enzyme; and

c) removing dislodged ink particles from the resulting pulp containing medium.

32. (currently amended) The method of Claim 31, wherein the enzyme is a cellulase selected from the group of cellulases derived from *Trichoderma viride*, *Aspergillus niger* or mixtures thereof wherein the cellulase is used in an amount between about 0.005 and about 5.0

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percent-by-weight based on the dry weight of the waste printed paper, the contacting being carried out at a temperature between ~~about 20°C~~ room temperature and about 60°C.

33. (currently amended) The method of Claim 31 wherein the amount of enzyme used is in the range of ~~about~~ 0.005 to ~~about~~ 5 percent-by-weight based on the dry weight of the wastepaper.

34. (currently amended) The method of Claim 31 wherein said enzyme is selected from the class consisting of cellulase, hemicellulase, pectinase, ~~other carbohydrases~~ and mixtures thereof.

35. (currently amended) The method of Claim 31 wherein said enzyme is a cellulase selected from the group consisting of cellulases derived from *Trichoderma viride*, *Aspergillus niger*, hemicellulases, ~~other carbohydrases~~ and mixtures thereof.

36. (Original) The method of Claim 31 wherein the in particles are removed by flotation or washing.

37. (currently amended) The method of Claim 31 wherein alkali is not added to the the pH of said aqueous medium is from about 3 to about 7.

38. (currently amended) The method of Claim 31 wherein the pulping occurs at a consistency of pulp wastepaper pulp consistency of about between 12% and 15% concentration or greater.

39. (cancelled)

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40. (currently amended) The method of Claim 31 wherein the temperature of the pulping is in a range of from ~~about 20°C~~ room temperature up to about 60°C.

41. (currently amended) A method of ~~biologically~~ de-inking waste printed paper comprising:

a) pulping at ~~an acidic or neutral~~ a pH between 3 and 8 the waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at ~~an acidic range or neutral range~~ a pH between 3 and 8, wherein ink is dislodged from the waste printed paper by action of the enzyme; and

b) removing dislodged ink particles from the resulting pulp containing medium.

42. (previously presented) The method of claim 31 wherein the enzyme enhances removal of materials selected from the group consisting of heavily coated inks, highly polymerized inks, non-impact inks, and cured polymer resins.

43. (previously presented) The method of claim 42 wherein the enzyme is effective to enhance removal of cured polymer resins.

44. (previously presented) The method of claim 31 wherein the enzyme is effective to debond fiber bonding.

45. (previously presented) The method of claim 25 wherein the enzyme degrades by enzymatic hydrolysis.

46. (previously presented) The method of claim 31 wherein the enzyme degrades by enzymatic hydrolysis.

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47. (previously presented) The method of claim 41 wherein the enzyme degrades by enzymatic hydrolysis.

48. (new) The method of claim 21 wherein the enzyme is not an alkali-resistant cellulase.

49. (new) The method of claim 21 wherein the wastepaper pulping consistency is at a common wastepaper pulping consistency.

50. (new) The method of claim 49 wherein the common wastepaper pulping consistency is between 4 and 7% concentration.